SAP Post Reading 2015 2016

After reading "**Natural Gas Really Is Better Than Coal**" write a short argument based on the information in the article defending or refuting the claim that natural gas is really better than coal.

Natural Gas Really Is Better Than Coal

If too much methane leaks during production, though, the benefits will be lost

By Sarah Zielinski , smithsonian.com, February 13, 2014

When talking about climate change, not all fossil fuels are created equal. Burning natural gas, for instance, produces nearly half as much carbon dioxide per unit of energy compared with coal. Natural gas is thus considered by many to be a "bridge fuel" that can help nations lower carbon emissions while they transition more slowly from fossil fuels to renewable, carbon-neutral forms of energy. The recent boom in natural gas production in the United States, for instance, contributed to a 3.8 percent drop in carbon emissions in 2012.

But natural gas has a climate downside—it's mostly composed of methane. "Methane is a potent greenhouse gas," said energy researcher Adam Brandt of Stanford University. The gas is about 30 times better at holding in the atmosphere's heat compared with carbon dioxide. So if enough methane leaks during production, natural gas's slim advantage over other fuels could be wiped out.

A report published today in *Science*, however, concludes that the United States' leaky natural gas production system currently isn't leaking enough methane to make it worse fuel for the climate than coal.

The natural gas production system is not sealed tight. There are some areas where methane is allowed to leak intentionally for purposes of safety, but there's also a lot of leaky valves and cracked pipes out there that can let the gas out. Quantifying all those leaks, though, has proven tricky.

The Environmental Protection Agency provides estimates of methane emitted in the United States. To calculate these estimates, someone has to go to a facility and take direct measurements from various equipment and devices. Those measurements are added up to get a total for the facility. And the facilities where the measurements are taken will serve as the basis for calculations of methane emissions for a type of source or a region.

These official estimates, however, probably underestimate total methane leaked because the devices that are sampled to provide those estimates aren't necessarily representative of all of the devices used by the natural gas industry to produce and move its product. In addition, sampling is expensive and limited. It also only takes place at locations where facilities let the EPA in—those facilities may be different from the average facility, leading to sampling bias.

Studies that have directly measured methane levels have gotten much different results. Atmospheric tests that have covered the entire United States come up with methane emissions

that are about 50 percent higher than the EPA estimates, according the new paper in *Science*. Partly that's because air sampling will pick up both anthropogenic methane and methane from natural sources, such as wetlands. But it's also because the EPA's methods are so inaccurate—natural sources only account for a fraction of the discrepancy**.**

The air sampling studies, though, have found some odd peaks in regional methane emissions, causing scientists to worry that there could be a lot more methane leaking from sites of natural gas production than thought. So Brandt and his colleagues began tallying up all the places where natural gas production could be leaking methane along with other sources of methane that could be mistaken for natural gas emissions.

The large natural gas leaks suggested in regional studies "are unlikely to be representative of the entire [natural gas] industry," they write. If there were natural gas leaks of that magnitude across the natural gas industry, then methane levels in the atmosphere would be much higher that surveyed in the air sampling studies. "Most devices do not leak," Brandt noted. Only about 1 to 2 percent of the devices used in natural gas production leak any methane, and large emitters—what the researchers nickname "superemitters"—are even rarer.

Brandt and his team then took a look at all the excess methane being released into the atmosphere. For their calculations, they assumed all that methane was coming from the natural gas industry. That's unlikely, they note, but it makes for a good worst-case scenario. But even that level of methane wasn't enough to make natural gas a bigger greenhouse gas contributor than coal, the researchers found. And switching from coal to natural gas for energy production does reduce the total greenhouse effect on a scale of 100 years, the standard scientists use in calculations like these.

"We believe the leakage rates are likely higher than official estimates, but they are unlikely to be high enough to disfavor shifting from coal to natural gas," Brandt said.

Natural gas has also been promoted as a cleaner fuel than diesel, and it's replaced that fuel in many trucks and buses on city streets. But the climate benefits of such a switch are not as clear as the switch from coal to natural gas.

Taking into account methane leaks from extraction all the way down the pipeline to the pump may actually make natural gas less climate friendly than diesel. But it's probably not time to abandon the natural gas bus. "There's all sorts of reasons we might want to [replace] diesel buses," Brandt says. For example, burning natural gas results in less air pollution and less reliance on imported petroleum.

For natural gas to assert itself as a more environmentally friendly fuel, though, the industry is going to have to plug up its leaky system. Companies may find it worth their while to do so, and not simply for the climate benefits. Less leakage equals more profit, and plugging just a few of the biggest leaks could easily increase income, Brandt says. "If we can develop ways to quickly and cheaply find these sources, it's going to be very profitable for companies."